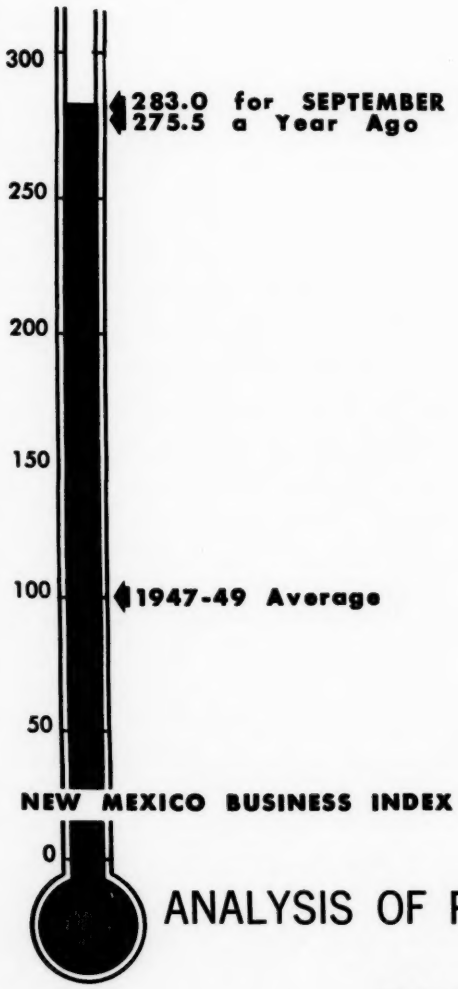
NOVEMBER 1961

New Mexico BUSINESS



Reversing the trend of the previous four months, business activity in New Mexico declined during September. Although the month-to-month movement of our business index was down almost 4 per cent, the volume of business conducted in the State during September 1961 was almost 3 per cent larger than that during September 1960. Final and complete data are not available, but on the basis of preliminary information it appears that economic activity in the State expanded significantly between September 31 and October 31, and that October business was much greater than that of October 1960.

The major cause of the September decline in our business index was the 3.7-per cent fall in bank debits. In addition, declines occurred in all other measures of business that we include in the overall index.

Between September 1960 and September 1961 the index of metallics production rose greatly. Other components of the overall index that also rose were building permits, life insurance sales, electric power production, petroleum production, and bank debits. Manufacturing employment and potash production declined between September 1960 and September 1961.

On a year-to-year basis, employment in the mining industry (specifically, metals) dropped. However, coupled with this downward movement was a significant increase in metallics production. While the metallics index does not include uranium production, we know that uranium employment has dropped during recent months. Available information does not tell us whether the mining employment decline reflects (1) a drop in uranium employment or (2) increasing automation in mines and mills, as suggested by the production gains.

ANALYSIS OF POPULATION CHANGES IN NEW MEXICO COUNTIES

Notes on U. S. Unemployment & on NM Mining

Analysis of Population Changes in New Mexico Counties

By GORDON K. PIERSON

Rather significant changes in population occurred in the counties of New Mexico between 1950 and 1960, changes which have been both positive and negative. This study attempts to explain a probable cause of these population shifts. Also, as a product of this analysis, certain relationships may be quantified, which might prove useful in making long-run population projections for various areas and counties within the State. The analysis, which follows, indicates that apparently changes in population are functionally related to changes in certain basic employment sectors. This relationship, while not precise, is significant and seems to establish the merit of this approach to regional analysis.

BASIC ECONOMIC SECTORS

A useful approach to the determination of the causes of population changes, as just mentioned, is to relate these changes to the increases or decreases of employment in the basic economic sectors. Any populated region which is not self-sufficient is characterized by an economic base, a base which generates the income used to import all those goods and services not produced within the given region. Although it is important, much business (employment)--such as retailing and wholesaling--is not "basic" to a region's economy. It serves the existing population, but its existence is largely dependent upon other forms of employment. For this reason, the analyst may wish to limit his attention to the more fundamental economic sectors. "Basic employment" cannot be precisely defined, but in regional analysis the term commonly refers to employment in those firms whose products or services are produced primarily for export. Such a firm, therefore, would tend not to serve the regional market under investigation; instead, the firm would serve customers outside the immediate area and its activities would generally reflect forces outside its immediate geographical location. The federal government provides an excellent example of a basic industry--and, hence, of a basic employment sector--in New Mexico. Other industry groupings, such as agriculture, manufacturing, timber, mining, etc., would also be so defined, to the extent that their markets lie beyond the boundaries of the State. Most retailing, however, should be considered a "secondary" activity.

Since the attention of this study is directed towards counties, not to the State as a whole, particular difficulties are involved. Quantifying that portion of an industry's business which is "basic" always presents a problem. A further difficulty is usually involved in allocating basic employment to particular counties. For New Mexico, however, such allocation is feasible, since the location of the manufacturing firms is known, and since employment figures for agriculture, mining, timber, and government are available by county. It should be noted that tourist activity should be included among the basic employment sectors. However, the paucity of tourist information in this state seems to provide ample reason for not quantifying this particular factor.

Analysis of New Mexico counties does raise another fundamental question. If the output of basic employment tends to be that which is exported from a region, should the analyst attempt to measure the activity in County A, which serves other counties in New Mexico but not primarily the markets of County A itself? For example, should the wholesaling in Albuquerque which supplies Socorro be considered basic to Bernalillo

county? Unfortunately, the answer to this question is rather technical, involving as it does a system of mutually dependent equations. Perhaps it will suffice to state that for purposes of this study "basic" employment in a county is defined as that portion of the employment which renders service primarily to markets outside the State. There is one important exception to this criterion: Santa Fe county, containing as it does the State Capitol and a large number of state employees, requires special attention, for little basic employment exists there if the above definition is used; therefore, all state employment is included as part of the basic employment category for Santa Fe county.

EMPLOYMENT AND POPULATION

There is a logical relationship between basic employment and total population. At least, this statement tends to be true in a country like the United States, which possesses a mobile labor force, which readily seeks out employment opportunities. The size of the population of particular regions of this nation will through time reflect the employment opportunities relative to other regions. Differing birth and death rates play a role in the determination of the level of population of an area. Yet, given time, most employees--and of course their families--do not usually remain in an area of limited employment opportunities. Instead, U.S. history has shown that labor tends to migrate to other more prosperous areas--normally, those areas closest to the potential worker's present domicile. Thus, size of the population tends to reflect the total level of employment and hence, in turn, the employment in certain basic sectors. This relationship, however, varies, depending upon the nature of the basic industrial sector. A firm which requires raw materials that the county can provide tends to exert a greater impact upon county population than does another firm whose purchases are made outside the county in question. It is possible that in this sense agriculture is characterized by a relatively large multiplier, since the farm inputs are generally purchased from, though not manufactured by, local suppliers. Also, agriculture provides a good example of another type of influence on population which differs among firms: namely, the secondary sectors (i.e., those that find their market in the immediate locality) respond to the variations in the income and the expenditure patterns of the residents of a region. An industry of low per capita income, such as agriculture, gives rise to a minimum level of retail sales and hence of employment in other dependent industries. It seems desirable, then, to examine the various kinds of basic employment to avoid concealment of their different effects on total population. Some discussion of this point is included in the interpretation of the results of this study. However, an attempt to quantify the differing influences of the various kinds of basic employment must wait until some future date because of the time required to run a regression analysis on the data to be presented.

MEASURING COUNTY CHANGES

As indicated above, this study attempts to examine the changes in county population, not the level of population at a particular point in time. While this fact does not lessen the value of basic employment as a tool of analysis, it does influence the technique to be used in quantifying the relationship between employment and population. For example, if population in 1950 was four times the employment of the basic sectors, but in 1960 it was a multiple of six times such employment, one might miscalculate the past or future effects upon the regional population of changes in basic employment. Neither ratio would necessarily produce correct results. Instead, the analyst must examine changes in basic employment and changes in population as explained below.

Useful Equations

This study is a test of the proposition that population in a given year is some function (unspecified) of the basic employment during the last few years. A time lag seems unavoidable, since the full impact of a change in this employment will probably not be felt immediately. Perhaps as much as two or three years might be required for population to adjust to employment changes, during which time other employment changes may have taken place. Therefore, $P_T = f(B_n)$. This equation states that population (P) in a particular year (T) is some function (f) of the basic employment (B) over the past few years (n). $P_T + 1 = g(B_n{}^1)$ then merely states that population (P) in some later year (T+1) is some other function (g) of basic employment (B) over the years immediately preceding this later period (n^1). Subtracting one function from the other provides the following result:

1. $P_T = f(B_n)$
2. $P_T + 1 = g(B_n{}^1)$
3. $\Delta P = h(\Delta B)$ (in which Δ signifies difference or change)

ΔP merely denotes the change in population during the time period, and $h\Delta B$ symbolizes that population change is some function (h) of the change (Δ) in basic employment (B). Mathematically, Equation 3 is analogous to the first derivative of time series data comparing population and employment in basic sectors. Within this framework, the study has examined the increases and decreases of population and basic employment between 1950 and 1960 in New Mexico counties.

TABLE I

COUNTY POPULATION CHANGES*
New Mexico, 1950-1960

Bernalillo	+116,486	McKinley	+ 5,434
Catron	- 760	Mora	- 2,692
Chaves	+ 17,044	Otero	+ 21,884
Colfax	- 2,955	Quay	- 1,722
Curry	+ 9,340	Rio Arriba	- 1,789
De Baca	- 473	Roosevelt	- 211
Dona Ana	+ 19,308	Sandoval	+ 219
Eddy	+ 10,143	San Juan	+ 32,293
Grant	- 2,949	San Miguel	- 3,044
Guadalupe	- 1,162	Santa Fe	+ 7,584
Harding	- 1,139	Sierra	- 777
Hidalgo	- 98	Socorro	+ 498
Lea	+ 22,712	Taos	- 1,174
Lincoln	+ 335	Torrance	- 1,515
Los Alamos	+ 2,561	Union	- 1,304
Luna	+ 1,086	Valencia	+ 15,526
STATE			+258,689

*Excludes Indian population changes on reservations and in pueblos.
Source: U.S. Bureau of the Census

The figures of basic employment used in this study are the averages of this employment from 1948 to 1950 and again from 1958 to 1960. The analysis attempts to quantify this ratio of $\Delta P/\Delta B$ for each of the 32 counties. The results should clarify, and to some extent quantify, the reasons for county population changes which have in some cases been rather significant. As will be discussed later, the ratio $\Delta P/\Delta B$ obtained from historical data does not give license to use the ratio carte blanche in making population projections, because the ratio may change through time.

Yardsticks of Population Shifts

Measuring the changes in population for each of our counties of course presented no difficulty. Census data were readily available. Table I provides these figures, with one important qualification: the Indian population has been subtracted from Table I figures if a pueblo or a reservation exists in the county. This seems reasonable, since increases or decreases in the Indian population appear to be nearly independent of the economic activity outside a pueblo or a reservation. Failure to account for this possibility would substantially influence the results of analysis if changes in the Indian populace were relatively large.

Sizing up Employment Shifts

Unlike yardsticks of population changes, the measurement of changes in basic employment introduces considerable difficulty. The very important question of definition has already been discussed. An additional difficulty arises from the fact that the analyst must estimate that portion of an industry's business, and hence employment, which serves out-of-state markets. Available information precludes reasonable estimates for many industries; therefore, all county employment in agriculture, federal government, mining, and timber is considered basic. Also, manufacturing and service employment was included where there was reason to believe it was not oriented primarily towards local markets. (The case of Sandia Corporation provides a good example of such an adjustment.) Table II presents county estimates of employment for the various employment sectors under examination. The estimates stem largely from ESC reports and U.S. Census information.

COUNTY DIFFERENCES

One might expect that among the counties the relationships between changes in population and in the various sectors of basic employment would be quite similar. Closer examination, however, suggests that some qualification of this point is necessary. After all, counties are political units--not necessarily economic entities. Therefore, people may work in one county, live in another county, and perhaps shop in still a third county. Furthermore, counties bordering other states will reflect to varying degrees the economic activity in the bordering areas. Still another qualification exists in the fact that population characteristics differ from one county to another. One county may have a particularly high birth or death rate. Perhaps another county's population tends not to respond to employment opportunities elsewhere, with immobility occurring for racial or social reasons. In any case, all of the above possibilities must be considered in comparing the ratio of $\Delta P/\Delta B$ (changes of population to changes in basic employment) of the various counties.

McKinley and Valencia Counties

The figures in Tables II and III reveal some numerical conformity in the relationship between ΔP and ΔB, but the dispersion is also significant. Many counties have a population which is a multiple of from approximately three to seven times their basic labor force. Others, however, are at one extreme or another and for that reason deserve our special attention. McKinley and Valencia counties furnish excellent evidence that counties are not necessarily economic units. Perhaps as much as 29 per cent of the labor force residing in Valencia actually works in McKinley, to which county it is assigned in ESC reports (and, therefore, in Table III). The secondary employment generated by these workers tends to occur in Valencia county, which is both their place of residence and largely the location of their retail expenditures. Adjustments for this situation, of course, would lower the figure in Column 8 for Valencia county and raise the corresponding estimate for McKinley county.

Sandoval County

Similar qualification is also required for other counties. Sandoval experienced a decline in basic employment of perhaps 640; yet it encountered a population increase of 211 (after adjustment for its Indian population). A likely explanation for these seemingly inconsistent statistics can be deduced from the census figure indicating that almost 40 per cent of the labor force residing in Sandoval county works outside the county. To a great extent these workers probably live near Albuquerque and Los Alamos; and, unlike Valencia county residents, they are apt to make their retail expenditures outside the county of residence. Thus, while basic employment declined (employment is recorded in the county where it occurs), population did not fall, because in some cases people were able to find employment in areas adjacent to their place of residence. Or, more likely, the population increase in the Corrales area, for example, directly reflects the substantial growth of Albuquerque.

Roosevelt County

Again, similar reasoning may partly explain the unusual Roosevelt county relationship between ΔP and ΔB. Approximately 10 per cent of Roosevelt's labor force is employed outside the county. If one recognizes this kind of problem, then many of the values in Column 8 become much less extreme.

Sierra County

Other considerations also exist which moderate certain of the Column-8 figures. Sierra county apparently experienced a 1950-1960 decline of 777 in population; yet basic employment fell very little. Possibly, ΔB has been underestimated. However, the primary explanation seems to lie elsewhere. One explanation might well stem from the county's population characteristics. An uncommonly high proportion of Sierra residents are 65 or over. Hence, between 1950 and 1960 the county had the highest death rate in the State (1/67 persons) and, conversely, the lowest birth rate (1/54 persons); so the decline in the number

TABLE II

AVERAGE CHANGES IN BASIC EMPLOYMENT SECTORS
New Mexico Counties, 1948-1950 and 1958-1960

	Gov.*	Ag.	Mfg. & Services	Timber	Mining	Total Basic Employment Changes
Bernalillo	+ 9,420	- 780	+ 7,700	- 40	+ 150	+16,450
Catron	+ 20	- 110	--	+ 40	--	- 50
Chaves	+ 4,410	+ 210	--	--	+ 520	+ 5,140
Colfax	+ 20	- 190	+ 70	+ 80	- 640	- 660
Curry	+ 2,890	- 590	--	--	+ 20	+ 2,320
De Baca	--	- 90	--	--	+ 10	- 80
Dona Ana	+ 4,680	+1,720	- 90	--	- 10	+ 6,300
Eddy	+ 110	+ 400	+ 50	--	+ 490	+ 1,050
Grant	+ 310	- 70	--	--	- 780	- 540
Guadalupe	+ 10	+ 10	--	--	--	+ 20
Harding	--	- 100	--	--	--	- 100
Hidalgo	--	+ 80	--	--	- 360	- 280
Lea	+ 50	+ 20	+ 1,240	--	+1,910	+ 3,220
Lincoln	--	- 80	--	- 10	--	- 90
Los Alamos	+ 1,850	--	--	--	--	+ 1,850
Luna	+ 20	+ 260	--	--	- 70	+ 210
McKinley	+ 1,270	+ 300	+ 110	- 20	+1,780	+ 3,440
Mora	+ 20	- 770	--	-110	--	- 860
Otero	+ 4,280	- 230	--	-140	--	+ 3,910
Quay	+ 10	- 170	--	--	+ 10	- 150
Rio Arriba	+ 60	-1,120	--	+190	+ 70	- 800
Roosevelt	+ 10	- 610	--	--	- 10	- 610
Sandoval	+ 20	- 330	--	-340	+ 10	- 640
San Juan	+ 190	- 900	+ 1,350	--	+2,440	+ 3,080
San Miguel	+ 30	- 530	+ 220	--	--	- 280
Santa Fe	+ 1,740**	- 380	--	+ 30	- 100	+ 1,290
Sierra	+ 50	- 70	--	--	- 10	- 30
Socorro	+ 20	- 420	--	+ 20	+ 210	- 170
Taos	+ 90	- 660	--	--	+ 110	- 460
Torrance	--	- 550	--	- 30	--	- 580
Union	+ 20	- 170	--	--	+ 20	- 130
Valencia	+ 50	- 320	--	-140	+1,400	+ 990
STATE	+31,650	-6,240	+10,650	-470	+7,170	+42,760

*Includes military and civilians.
**Includes state government employees.
Sources: U.S. Bureau of the Census and N. M. Employment Security Commission

of inhabitants to a great extent reflects not net emigration but a populace which is experiencing a very high death rate.

TABLE III

COMPARISON OF TABLES I AND II

	Total Basic Employment Changes (ΔB)	Population Changes (ΔP)	ΔP/ΔB
Bernalillo	+16,450	+116,486	7.1
Catron	- 50	- 760	15.2
Chaves	+ 5,140	+ 17,044	3.3
Colfax	- 660	- 2,955	4.5
Curry	+ 2,320	+ 9,340	4.0
De Baca	- 80	- 473	5.9
Dona Ana	+ 6,300	+ 19,308	3.1
Eddy	+ 1,050	+ 10,143	9.7
Grant	- 540	- 2,949	5.5
Guadalupe	+ 20	- 1,162	--
Harding	- 100	- 1,139	11.4
Hidalgo	- 280	- 98	0.4
Lea	+ 3,220	+ 22,712	7.1
Lincoln	- 90	+ 335	--
Los Alamos	+ 1,850	+ 2,561	1.4
Luna	+ 210	+ 1,086	5.2
McKinley	+ 3,440	+ 5,434	1.6
Mora	- 860	- 2,692	3.1
Otero	+ 3,910	+ 21,884	5.6
Quay	- 150	- 1,722	11.5
Rio Arriba	- 800	- 1,789	2.2
Roosevelt	- 610	- 211	0.3
Sandoval	- 640	+ 219	--
San Juan	+ 3,080	+ 32,293	10.5
San Miguel	- 280	- 3,044	10.9
Santa Fe	+ 1,290	+ 7,584	5.9
Sierra	- 30	- 777	--
Socorro	- 170	+ 498	2.9
Taos	- 460	- 1,174	2.6
Torrance	- 580	- 1,515	2.6
Union	- 130	- 1,304	10.0
Valencia	+ 990	+ 15,526	15.7
STATE	+42,760	+258,689	6.0

*Includes military and civilians.
**Includes state government employees.
Sources: U. S. Bureau of the Census and N. M. Employment Security Commission

Lincoln County

Lincoln county also warrants particular attention. Here, as estimated, basic employment declined, yet population increased. As mentioned previously, our estimates of basic employment do not include the nebulous, and difficult to measure, category of tourism. Very likely, herein lies the reason for the apparently incongruous figures for Lincoln county. The comparatively extensive development of tourist activity there, particularly in and around Ruidoso, unquestionably has prevented the decline in population normally associated with a decrease in basic employment. Ruidoso's population gain between 1950 and 1960 (approximately 100 per cent) tends to substantiate this hypothesis.

Counties with Above-Average Population Losses

There also seems to be an additional point to be made in interpreting the experiences of Guadalupe, Harding, Quay, San Miguel, and Union counties, all of which experienced population decreases substantially larger than those of the other counties generally. Although the precise explanation of this phenomenon is unknown, certain economic characteristics common to all five may offer a partial elucidation. Agriculture, in general, has been the economic base in these counties; and, as shown in Table III, it is the sector which experienced the major decline in employment during the period under investigation. A rather cursory examination of the data might suggest that a relatively high negative multiplier exists for agriculture. Perhaps this situation stems from the tendency for a network of suppliers to form in agriculturally oriented regions, unlike some regional industries which are geographically quite remote from the firms providing their inputs. An explanation, perhaps more likely than a high negative multiplier, is the fact that employment opportunity improved markedly in the larger urban areas of the State. Even if agriculture had not weakened in importance, emigration would have occurred from these rural areas. Limited time prevented a statistical estimate of the relative effects that agriculture, or the other basic sectors, have had on changes in population. It has just been noted that one industry may well produce a greater effect than another. It is hoped, therefore, that at some future date more complete examination will be possible. However, for the present, tentative conclusions will have to be drawn from this less detailed analysis.

Other County Situations

Compensating for the many qualifications essential to interpreting the ratio of ΔP/ΔB, Table III does suggest that changes in certain basic employment sectors were responsible for changes in population between 1950 and 1960. The decline in agriculture was apparently the prime reason for population losses in many counties--Catron, Union, Taos, and Rio Arriba, to mention a few. Timber apparently played a small role in the overall picture, except possibly in Sandoval and Mora counties. Reductions in mining activity also adversely affected the level of population in counties such as Curry and Grant. However, in Lea, Eddy, and San Juan there were sizeable gains in mining employment and rather substantial growth in population. The estimated change in federal government employment seems to account for the primary increase in population in Bernalillo, Chaves, Curry, Dona Ana, Otero, and of

course Los Alamos. The growth in state government employment explains Santa Fe county's population rise. Manufacturing and services, it will be noticed, are closely associated with the greater strength in the mining and the government sectors, as illustrated by the situations in Bernalillo, Lea, and San Juan. This relationship is not surprising when one considers that manufacturing and services as defined in this study primarily include refining and chemical firms, as well as government-financed producers and/or service firms. In any case, enlargement of manufacturing activity did contribute to population increases in the above-mentioned counties.

CONFORMITY AND DISPERSION

The tables do reveal some conformity between ΔP and ΔB. True, dispersion exists. However, the tourist "industry" has had to be excluded from specific analysis. Also, if one remembers that a county is a politically and geographically defined area whose economic activity is in varying degrees a function of forces outside the county, the dispersion does not seem unreasonable. Indeed, the relationship between ΔP and ΔB, as analyzed, seems quite consistent.

Certain of the difficulties causing dispersion can be obviated by combining the counties into larger units. Random grouping, in and of itself, tends to reduce the range of values of $\Delta P/\Delta B$. However, in the following analysis counties have been combined, with consideration directed to their economic interdependence; and due regard has been given to the geographic proximity of one county to another. Thus, the fact that more complete economic regions have been formed would seem to be a prime reason for the reduction in the dispersion of $\Delta P/\Delta B$ to a range of approximately four to seven, as shown in Table IV. For example, the groupings tend to eliminate the effects of people who live, work, and/or trade in different counties, so that the problem exemplified by McKinley and Valencia counties, previously discussed, tends to disappear. The entire array of secondary entrepreneurial activity (employment) then seems to reflect the production and output of those economic sectors which are basic to each grouping.

TABLE IV

BASIC EMPLOYMENT AND POPULATION CHANGES
BY COUNTIES GROUPED ACCORDING TO
GEOGRAPHY AND ECONOMIC STRUCTURE
New Mexico, 1948-1960

	ΔB	ΔP	
Catron	- 50	- 760	
Dona Ana	+ 6,300	+ 19,308	
Grant	- 540	- 2,949	
Hidalgo	- 280	- 58	
Luna	+ 210	+ 1,086	
Otero	+ 3,910	+ 21,884	
Sierra	- 30	- 777	
Socorro	- 170	+ 498	
	+ 9,350	+ 38,192	$\Delta P/\Delta B = 4.1$
McKinley	+ 3,440	+ 5,434	
San Juan	+ 3,080	+ 32,293	
Valencia	+ 990	+ 15,526	
	+ 7,510	+ 53,253	$\Delta P/\Delta B = 7.1$
Los Alamos	+ 1,850	+ 2,561	
Rio Arriba	- 800	- 1,789	
Sandoval	- 640	+ 219	
Santa Fe	+ 1,290	+ 7,584	
Taos	- 460	- 1,174	
	+ 1,240	+ 7,401	$\Delta P/\Delta B = 6.0$
Colfax	- 660	- 2,955	
Harding	- 100	- 1,139	
Mora	- 860	- 2,692	
San Miguel	- 280	- 3,044	
Torrance	- 580	- 1,515	
Union	- 130	- 1,304	
	- 2,610	- 12,649	$\Delta P/\Delta B = 4.8$
Curry	+ 2,320	+ 9,340	
De Baca	- 80	- 473	
Guadalupe	+ 20	- 1,162	
Quay	- 150	- 1,722	
Roosevelt	- 610	- 211	
	+ 1,500	+ 5,772	$\Delta P/\Delta B = 3.8$
Chaves	+ 5,140	+ 17,044	
Eddy	+ 1,050	+ 10,143	
Lea	+ 3,220	+ 22,712	
Lincoln	- 90	+ 335	
	+ 9,320	+ 50,234	$\Delta P/\Delta B = 5.4$
Bernalillo	+16,450	+116,486	$\Delta P/\Delta B = 7.1$

Sources: U.S. Bureau of the Census and N. M. Employment Security Commission

Column 3 of Table IV reveals considerable uniformity in values. Complete agreement still cannot be expected, since tourist expenditures have not been estimated and are certain to produce varying effects on these groupings not accounted for in the values of $\Delta P/\Delta B$. Racial and social characteristics differ among these regions and will alter the type and perhaps the pattern of business operations. A further reason for not expecting the ratio of the population change to the basic employment change to be entirely uniform, even among a complete economic unit, is the likelihood that basic employment sectors will differ in their multiplier effects. For example, it seems probable that expansion of certain types of manufacturing employment has a greater impact on total employment than improvements in the timber industry have. Because timber employment is seasonal, it tends to be a lower per capita income sector than certain kinds of manufacturing; and, hence, it gives rise to a lesser amount of retail and wholesale activity. The diversity in the total regional influence of the various basic labor force categories used in this study stems from factors too numerous to itemize here. However, the proximity of a producer to his product market and/or his suppliers provides a good example of influence that might exaggerate the effects of a particular industry.

CONCLUSIONS

All in all, the results of this brief analysis do indicate a rather positive relationship between changes in population and in basic employment. Unfortunately, the attempt to quantify this relationship, while interesting, reveals the limitations of using the value of $\Delta P/\Delta B$ to project population on a county basis. As discussed above, the experience of the counties varies greatly, and hence no single value is applicable to all counties. It is possible to use the particular $\Delta P/\Delta B$ of each county in estimating future population, but such use implies that this particular relationship will hold true in the future. Such an assumption may be reasonable; but changes in nonregional influences and in regional influences (changing population characteristics, increases or decreases in tourist trade, shifts in production functions, etc.) are factors which must be considered before we can accept the validity of the assumption. Further, an increase in basic activities may generate other types of employment in varying degrees, depending upon the size of the initial population or depending upon the state of the economic maturity of the region. Unfortunately, it is not easy to generalize about the nature of the influence of these factors. Indeed, it seems possible that these qualifying aspects could produce either positive or negative effects on the relationships of ΔB and ΔP if they were combined in varying ways. Despite the qualifications, the past experience of particular counties can be useful in checking long-run population projections.

Until one has predicted the future path of the more important income-generating sectors, a population projection cannot be accepted without serious question. Since the method used in this study is valuable in explaining population changes, this analyst hopes that subsequent studies will be possible which examine the more specific effects of each of the various basic employment sectors.

NOTE ON UNEMPLOYMENT AND U. S. FAMILIES

How has the high level of unemployment affected American families? This is the question answered, at least in part, by a special labor force report, an advance summary of which was issued in the summer by the U. S. Department of Labor. Although figures given in the report were based on information gathered in March, the question remains important.

The report shows that, as of March, the nation had 2.1 million married men and 900,000 married women then unemployed. Of the married men unemployed, about 700,000 had wives who were working; but an estimated 170,000 had wives who were also unemployed. In other words, 20 per cent of all women in the labor force whose husbands were unemployed were themselves looking for work. The rate of unemployment for wives whose husbands were jobless was 6 per cent higher than that for women whose husbands were employed. This situation seems reasonable in that the economic factors causing layoffs for the husbands probably also affect employment opportunities for women in the same area. On the other hand, it is also logical to suppose that many women have been forced to take some kind of job if available.

One sixth of the national jobless figure was accounted for by unemployed married women. About 200,000 had husbands who were either unemployed or were not in the labor force for reasons such as disability or retirement. The remaining 700,000 had working husbands, exactly the number of unemployed men with working wives--an interesting coincidence.

Between March 1960 and March 1961 total unemployment increased by 1.3 million--600,000 married men and 250,000 married women contributing to the large increase. The number of couples in which both husband and wife were jobless doubled during the same period.

Among widowed, divorced, and separated persons, many of whom have the responsibility of heading a family, unemployment totaled 750,000 in March of this year, an increase of 170,000 during the 12-month span. Single persons, representing a total of 1.7 million unemployed, constituted a large segment of the jobless. Of this 1.7 million, 1.3 million were over 18 years old. The full report is to be issued by the U.S. Department of Labor by the end of this year.

L. L.

MINING BRIEFS

Molybdenum

(Excerpt from the most recent "Progress Report to Stockholders," October 26, 1961, from the Molybdenum Corporation of America)

In November 1960 we reported to you with respect to results of exploration work to June 30, 1960, at our New Mexico property. At that time we announced that a very large area of molybdenum mineralization had been encountered and that work would continue in order to determine the extent of the deposit and to explore areas of indicated enrichment.

Since June 30, 1960, about 16,000 feet of drill core and sludge have been extracted from 29 diamond drill holes and 5,500 feet of tunneling has been completed. The core and sludge from each 10 feet of drill length and car samples were assayed for molybdenum disulphide (MoS_2) content and all assays showed molybdenum mineralization. Thirteen of the above drill holes and about 30 per cent of the tunnels were in an enriched zone in the northeast portion of the area and 12 drill holes and 60 per cent of the tunnels were in an enriched area to the south.

Summarizing the results of exploration to date, we have explored an area of approximately one mile square by tunneling and underground diamond drilling. For some time our work has been concentrated within two sizable areas of favorable molybdenum mineralization as indicated by drill hole and tunnel assays. The assays from the area in the South have indicated a grade of mineralization of 0.3 per cent to 0.4 per cent MoS_2. Assays from the area in the Northeast have indicated mineralization of considerably higher grade. The work currently being conducted is directed toward establishing definite tonnages and grades in order to determine the feasibility of commercial operation in these enriched areas.

In 1961 we acquired by location a large amount of additional ground contiguous to our property so that the area now held by us measures approximately 10 miles by two miles. There are geological indications that portions of this area may be mineralized in a manner similar to that explored to date and we plan to explore this additional land as soon as practicable.

[Recently] several large mining companies have expressed an interest in participating with us in the Questa property, but your Directors have determined that, because of the short time necessary to more definitely evaluate Questa, it is in the best interest of the Company to defer consideration of such proposals until conclusion of currently projected exploration work.

Oil

The U.S. Bureau of Mines recently cited examples which clearly illustrate the problems faced today by oil companies in the matter of the cost-price squeeze. The Bureau has estimated that the average selling price of a barrel of crude oil currently is $2.90, that the current cost of producing a barrel of crude is $3.38; in other words, on every barrel of crude an oil company sells there is a loss of 48 cents.

The per-barrel cost of operating a refinery in 1950 was 91 cents. By 1959 that had jumped to $1.34--a 48-per cent hike in operating costs. Yet the wholesale price of refined petroleum products increased during the same period only 11 per cent.

Silenium, Vanadium, and Uranium

The possibility of the recovery of three other minerals, in addition to uranium, in the Ambrosia Lake district was suggested in September by Fred Hahn, chief geologist of Kermac Nuclear Fuels Corporation. Mr. Hahn said that molybdenum, silenium, and vanadium have been found in the same formations that bear uranium ore. No attempt had been made at that time to recover the three by-product minerals, which were then discarded in the uranium milling process.

In discussing the mining of uranium and the probable origin of uranium ores, Mr. Hahn referred to three theories, his favorite being that uranium--like gold, lead, zinc, and other minerals--derived from deep under ground along fracture lines and migrated laterally until it precipitated when it encountered a favorable chemical environment. Another theory is that the uranium was distributed in volcanic ash. Mining uranium in Ambrosia Lake was described by Mr. Hahn as "possibly the toughest in the world," because of the wetness of the mines and the uneven occurrence of the ore bodies. To a geologist mapping ore bodies, uranium frequently looks, in the words of Mr. Hahn, "like a school of minnows swimming upstream."

According to the geologists, Ambrosia Lake uranium ore deposits are as old as 60 million years and as young as 10,000 years.

Potash

The Carlsbad area has another potash company--one formed by the Kerr-McGee Oil Industries, Inc., of Oklahoma City, and the National Farmers Union Service Corporation, of Denver. The new enterprise, called Kermac Potash Company, will be a partnership in which a wholly owned subsidiary of each parent company will have a 50-per cent interest. A large pilot-plant program has been launched at Kerr-McGee's metallurgical laboratory in Golden, Colorado, with the objective of choosing a design and specifications for a 1,500-ton-per-day potash plant to be constructed soon.

Kerr-McGee will be operating partners for all phases of the new venture. The presidents of the parent companies are D. A. McGee, of Kerr-McGee, and James G. Patton, of Farmers Union. They have said that the potash market has been expanding at the rate of 6 per cent a year. "We are pleased to join forces in this venture," Mr. McGee and Mr. Patton have declared, "and look forward with enthusiasm to participating in the rapidly expanding potash market."

* * *

According to announcement by the operation's manager, production of magnesium oxide and hydrochloric acid at the Carlsbad plant of International Minerals & Chemicals Corporation is being discontinued. Magnesium oxide produced at this plant is of the highest purity available in America. Markets for the product, however, have failed to support the costs of producing such pure materials, and the situation has led to the firm's decision to discontinue its manufacture. Hydrochloric acid was a by-product of the same section and, therefore, will no longer be produced by International.

About 45 of the company's 900 employees will be affected by the section shutdown, but actual layoffs are to be minimized. IMC has held down replacement of normal personnel losses through the shutdown date, so that these vacancies can be reserved for employees affected by the shutdown.

Completion of a multiple-project program of expansion and improvement, representing an investment of more than $1.8 million, is expected before the end of 1961, according to announcement by E. C. Skinner, operations manager of the Carlsbad potash operation of IMC. Now installed and under study is a $300,000 installation designed to remove the ore from the face in the mine and transfer it to haulage equipment, eliminating several steps in the usual mining process.

Engineers from IMC and from a cooperating outfit are making detailed studies of the experimental operation program International has set up to establish the most effective methods of operating and maintaining the new facility. From these studies, they hope to develop information on the design of a machine for use in even lower-type ore, a development which would materially extend the life of IMC's Carlsbad potash holdings.

Nearing completion, the largest item on the program is a 10,000-ton raw-ore storage building, into which ore can be dumped directly from the mine. Conveyors operating in a trench below the general floor level transfer the ore to the crushing and refining section. Completion is expected in December. Also scheduled for final touches about the same time is a $500,000 project for enlarging and improving the facilities for drying finished fertilizer-grade potash products. Other improvement and expansion projects at the Carlsbad operation are well along in the planning stage, according to company officials, who expect contracts to be let within the next few months.

Copper

A renewal of mining activities in the Scholle District of Torrance and Socorro counties was reported in the late summer. According to press releases, the Scholle copper mining district of the two counties has attracted the attention of oil and copper mining interests by the reported mapping of large bodies of low-grade copper ore, which may be suitable for "in-place" leaching by the injection and recovery of leach solutions and precipitation of the copper values. The process is similar to secondary recovery of petroleum by water flooding. Recent tests by the U.S. Bureau of Mines to determine the feasibility of leaching of oxidized copper ores by downward percolation have indicated that the Scholle area may have copper deposits which are recoverable by this particular method. More than 300 mining claims are said to have been staked in the district by crews, with an outfit of oil-recovery engineers from Nebraska taking many claims and reportedly preparing a copperflood leach program, which may now be in operation.

Iron

Late in October, the press reported that a small but promising iron-ore mining operation had begun trucking ore to the Coyote railhead, an abandoned railroad water point nine miles north of Carrizozo. The stripping operation is 23 miles off Highway 54 beyond the volcanic cones at the head of malpais lava beds just over the line in Socorro county. A spokesman for the operation has been quoted as saying that he has found "tremendous reserves" of the iron ore and that it has assayed 60 per cent iron on sample.

M. M.

Business Activity in New Mexico

	September 1961	Year Earlier September 1960	Per Cent Change September 1961 from Aug. 1961	Per Cent Change September 1961 from Sept. 1960	INDEX September 1961 (Average Month 1947-49 = 100)
Index of Business Activity (1947-49 = 100)	283.0	275.5	- 3.9	+ 2.7	283.0
Sales data: Not available. See March 1959 issue of NEW MEXICO BUSINESS					
*Life Insurance Sales (1,000s)	$ 25,604	$ 23,754	- 5.7	+ 7.8	730.1
*Bank Debits, 34 banks (1,000s)	488,547	487,223	- 3.7	+ 0.3	306.0[a]
Bank Loans and Discounts, 34 banks (1,000s)	46,287	45,626	- 2.0	+ 1.5	273.1[a]
Demand Deposits, 34 banks (1,000s)	336,266	328,453	- 1.1	+ 2.4	182.1[a]
Time Deposits, 34 banks (1,000s)	154,648	140,530	+ 0.1	+ 10.0	450.0[a]
Business Failure Liabilities (1,000s)[b]	161	341	- 54.8	- 52.8	562.4
Wage Workers in Nonagricultural Establishments	237,400	239,100	0.0	- 0.7	179.0
in Mining	19,700	20,400	+ 1.0	- 3.4	162.0
in Contract Construction	18,100	19,500	- 4.2	- 7.2	143.5
*in Manufacturing	16,100	16,700	- 1.2	- 3.6	187.8
in Transportation and Utilities	20,000	20,800	- 0.5	- 3.8	125.1
in Trade	50,400	50,200	- 0.6	+ 0.4	173.4
in Finance, Insurance, and Real Estate	9,900	9,600	- 1.0	+ 3.1	317.6
in Services and Miscellaneous	38,900	38,300	+ 0.3	+ 1.6	179.1
in Government	64,300	63,600	+ 2.1	+ 1.1	218.7
Number of Insured Unemployed	7,118	5,123	- 12.1	+ 38.9	--
Rate of Unemployment (per cent of labor force)	3.69	2.66	- 9.1	+ 38.7	237.3
Construction Contracts Awarded (value in 1,000s)	$ 15,541	$ 16,085	+ 5.7	- 3.4	--
Residential (value in 1,000s)	$ 5,835	$ 6,957	- 33.8	- 16.1	--
Number of Permits	446	534	- 29.4	- 16.5	--
Floor Area (1,000 sq ft)	542	653	- 32.8	- 17.0	--
Nonresidential (value in 1,000s)	$ 4,704	$ 5,568	+ 74.2	- 15.5	--
Floor Area (1,000 sq ft)	265	467	+ 16.2	- 43.3	--
Heavy Engineering (value in 1,000s)	$ 5,002	$ 3,560	+ 57.3	+ 40.5	--
*Petroleum Production (1,000s of bbls)	9,046	8,698	- 4.3	+ 4.0	238.5
Natural Gas Production (millions of cu ft)	58,748	60,695	- 2.2	- 3.2	365.2
*Electric Power Production (1,000s of kwhs)	308,764	285,706	- 12.0	+ 8.1	349.9
*Index of Total Metallics Production (1947-49 = 100)	105.5	74.8	- 2.1	+ 41.1	105.5
Mine Production - Copper (1,000s of lbs)	13,690	10,636	- 0.2	+ 28.7	129.5
Mine Production - Lead (1,000s of lbs)	420	294	- 9.5	+ 42.9	40.5
Mine Production - Zinc (1,000s of lbs)	4,420	2,360	- 5.9	+ 87.3	69.2
*Mine Production - Potash (1,000s of tons)	1,268	1,292	- 1.5	- 1.9	316.7
Index of All Farm Prices (1947-49 = 100)	101.4	93.1	+ 2.4	+ 8.9	101.4
Index of Livestock Prices	106.4	98.0	+ 2.9	+ 8.6	106.4
Index of Crop Prices	96.4	87.7	+ 0.8	+ 9.9	96.4
Receipts from All Farm Marketings (1,000s)	$ 18,876	$ 17,731	+110.7	+ 6.5	168.0
Livestock and Products	12,922	12,219	+143.5	+ 5.8	198.1
Crops	5,954	5,512	+ 63.0	+ 8.0	125.5

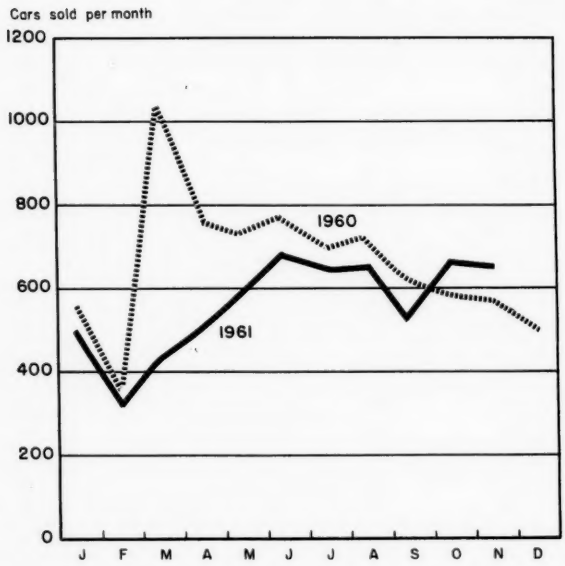
	October 1961	Year Earlier October 1960	Per Cent Change October 1961 from Sept. 1961	Per Cent Change October 1961 from Oct. 1960	INDEX October 1961 (Average Month 1947-49 = 100)
Bank Debits, 34 banks (1,000s)	$532,194	$487,169	+ 8.9	+ 9.2	333.2[a]
Bank Loans and Discounts, 34 banks (1,000s)	48,553	44,694	+ 4.9	+ 8.6	286.5[a]
Demand Deposits, 34 banks (1,000s)	358,003	338,216	+ 6.5	+ 5.8	193.9[a]
Time Deposits, 34 banks (1,000s)	158,024	143,385	+ 2.2	+ 10.2	459.9[a]
Wage Workers in Nonagricultural Establishments	235,800	237,100	- 0.7	- 0.5	177.8
Number of Insured Unemployed	7,043	5,447	+ 0.3	+ 28.9	--
Rate of Unemployment (per cent of labor force)	3.70	2.87	- 1.1	+ 29.3	238.3
*Building Permits, total 18 cities (1,000s)	$ 6,926	$ 5,098	- 0.3	+ 35.8	240.8[a]
Residential	3,609	2,761	- 2.2	+ 30.7	202.4[a]
Nonresidential	2,394	1,529	+ 6.1	+ 56.6	328.1[a]
Other	922	808	- 8.6	+ 14.0	254.1[a]
Index of All Farm Prices (1947-49 = 100)	102.8	95.2	+ 1.4	+ 8.0	102.8
Index of Livestock Prices	107.7	100.3	+ 1.2	+ 7.4	107.7
Index of Crop Prices	98.4	89.3	+ 2.1	+ 10.2	98.4

*Indexes for these items are used to compute the Index of Business Activity.
[a]Although the number of reporting units changes, the indexes for these items are comparable with indexes for preceding months.
[b]The figures in this series are based on the average of three months' data.

Sources:
Retail Sales Data: N. M. Bureau of Revenue
Potash Production: N. M. Bureau of Revenue
Petroleum and Natural Gas Production: N. M. Oil Conservation Commission
Life Insurance Sales (New Ordinary): Life Insurance Agency Management Association
Wage Workers and Unemployment: N. M. Employment Security Commission and U. S. Department of Labor
Electric Power Production: Federal Power Commission
Metallics Production: U. S. Bureau of Mines
Farm Prices and Marketings: U. S. Agricultural Marketing Service
Bank Data (all series) and Building Permits: Bureau of Business Research, UNM
Business Failure Liabilities: Dun & Bradstreet, Inc.
Construction Contracts: F. W. Dodge Corporation

CHART-OF-THE-MONTH

This year's monthly new-car sales
in Bernallilo county stayed under 1960's
corresponding sales until October.



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